DETAILED ACTION

Drawings

The drawings are objected to because they are not designated as "Figures". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the

section heading, the phrase "Not Applicable" should follow the section heading (not applicable sections have been omitted):

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(f) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 5, 7, 8, 11, 12, 14 and 16 are rejected under 35 U.S.C. 102 (b) as being anticipated by Mahoney et al. (US Patent No. 5,975,406).

Mahoney et al. teach a method of repairing (increasing the stability and/or load carrying capacity) an aluminum alloy (produced by any conventional process) where the work piece (Figures 3A-3E, Element 30) has a hole 32 in the area to be repaired. A second work piece (tapered plug 38, consisting of a stability increasing material) is then introduced into the hole 32. The plug is then rotated in (rubbed relative to) the hole creating frictional energy to plasticize the material

(not melting, i.e. below the melting temperature of the work pieces) in order to create a friction-welded connection between the two work pieces (column 3 line 27 – column 4 line 64).

In regard to **claim 2**, Mahoney et al. teach that the hole 32, is machined to form a tapered bore 36 such that the tapered plug 38 (which has rotational symmetry as seen in all figures), this process is an exemplary method of friction stir welding and friction cone welding.

In regard to **claims 3 and 8**, as seen in Figures 4C, 4D, 5A, 5B and 6 of Mahoney et al. the hole is filled at least partly by the second work piece in a connected state.

In regard to **claims 5, 7, 11, 12, 14 and 16**, the first work piece of Mahoney et al. is taught to be aluminum or an aluminum alloy which is a light metal or light metal alloy.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4, 9, 10, 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney et al. (US Patent No. 5,975,406) as applied to one of claims 1-3 above, and further in view of Ely (US Patent No. 3,487,530).

Mahoney et al. teach a method of repairing an aluminum work piece by friction stir welding a hole in the work piece with a tapered plug as applied to claims 1-3 above. Claims 4, 9, 10, 13 and 18 differ from the Mahoney et al. in calling for the first work piece to be produced by a casting process. Although Mahoney et al. does not specifically disclose that the work piece is made by a casting production process, it would have been obvious in the art to make the work piece by a casting process because Ely teaches a method of repairing casting defects (in castings) 11 in work pieces 10 using a similar friction welding process with a repair plug 14 (column 2, lines 18-45, Figures 1A-1F).

5. Claims 6, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney et al. (US Patent No. 5,975,406) as applied to one of claims 5, 11 or 12 above, and further in view of Okamoto et al. (US Publication No. 2003/0047584).

Mahoney et al. teach a method of repairing an aluminum work piece by friction stir welding a hole in the work piece with a tapered plug as applied to claims 1-3 above. Claims 6, 15 and 17 differ from the Mahoney et al. in calling for the first work piece to be made of magnesium or a magnesium alloy. Although Mahoney et al. does not specifically disclose that the work piece is made of magnesium or a magnesium alloy, it would have been obvious in the art to make the work piece from magnesium or a magnesium alloy because Okamoto et al. teach a method of friction stir welding where the work pieces can be made of aluminum/aluminum alloys or magnesium/magnesium alloys (page 1, paragraph [0002]) in order to

enhance the strength/weight of a finished workpiece as magnesium is a well known light metal/light metal alloy which is common substitute for aluminum for applications where reducing weight is primary objective.

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney et al. (US Patent No. 5,975,406) and Ely (US Patent No. 3,487,530).as applied to claim 13 above, and further in view of Okamoto et al. (US Publication No. 2003/0047584).

Mahoney et al. in view of Ely teach a method of repairing an aluminum work piece by friction stir welding a hole in the work piece with a tapered plug (where the work piece is made by a casting process) as applied to claim 13 above. Claim 19 differs from the references in calling for work piece to be comprised of magnesium or a magnesium alloy; however it would have been obvious in the art to make the work piece from magnesium or a magnesium alloy because Okamoto et al. teach a method of friction stir welding where the work pieces can be made of aluminum/aluminum alloys or magnesium/magnesium alloys (page 1, paragraph [0002]) in order to enhance the strength/weight of a finished workpiece as magnesium is a well known light metal/light metal alloy which is common substitute for aluminum for applications where reducing weight is primary objective.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Chuan Yao can be reached on (571) 272-1224. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NPD
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